The topographical feature of the observing place seems to have a very great influence on the occurrence of first ice.

It is obvious that the relative dates would be modified, or even in some cases reversed, by varying the standard as regards either the amount of water, the nature of the containing vessel, or the hour at which it is filled. A wide range of experiments along these lines might be carried out. The use of distilled water would also be an improvement.

4. T. Okada.—Evaporation in Japan.

The evaporimeter used is described above. Results are presented from fifty stations, from Formosa, in the Tropics, to Nemuro, in latitude 43° north. The author finds that—

The annual variation of evaporation in this country is governed by rather simple laws. The variation of evaporation presents double maxima and minima. The evaporation increases gradually from January to May and reaches a minimum in June. Then it increases abruptly to a maximum in August, and again decreases abruptly to the minimum in January. These variations can be easily accounted for by considering the effect of the temperature and sunshine duration. * * * Evaporation is greatest in the Formosa and Liukiu islands and smallest in the eastern Hokkaido, showing undeniably the remarkable influence of the temperature on this climatological element. In Formosa, lying under the Tropics, the annual evaporation amounts to 1500 millimeters in average, while in Hokkaido, sharing the arctic climate of Kuriles, it is below 800 millimeters. * * *

The abnormally great evaporation in the Inland Sea region is due to the large amount of bright sunshine that there prevails. This portion of the country is completely surrounded by high mountain ranges, so that wet winds lose their loaded vapor by passing these gigantic barriers and turn into dry ascending currents of the air which excite the evaporation of water in that region. * * * The greatest annual evaporation is 1910 millimeters at Koshun in southern Formosa, and the least is 726 millimeters at Kushiro in eastern Hokkaido.

Mr. Okada discusses also the effects of wind, precipitation, and orography, and the reduction of evaporation for altitude, and presents, in a number of tables, the average annual, monthly, and daily evaporation, together with the figures for each month and year at sixteen selected stations.—*F. O. S.*

WEATHER BUREAU MEN AS INSTRUCTORS.

Mr. James L. Bartlett, Observer, Madison, Wis., will act as instructor in meteorology at the University of Wisconsin. The course in meteorology, which will be offered for the first time during the present school year, is described in the university catalogue as "Meteorology: an elementary course in the theory and practise of meteorology with especial reference to the work of the U. S. Weather Bureau. Second semester. Three hours per week."

Mr. Joseph L. Cline, Observer, Corpus Christi, Tex., has been appointed instructor in meteorology in the high school of that city. The board of school trustees expects to make this subject a permanent feature of the curriculum. The course will consist of the general study of meteorology; meteorological instruments, their construction and errors; laboratory work in constructing weather maps; forecasting; and climate in relation to agriculture, commerce, and mankind; effects upon the human race. Meteorology is obligatory in the junior and senior years. The class this year consists of 26 pupils, and the first lesson was given September 14, 1904. Mr. Cline states that with the exception of the State Medical College, where Dr. I. M. Cline delivered a series of lectures, this is the first educational institution in Texas to adopt a regular course in meteorology.

Mr. E. D. Emigh, Assistant Observer, Dodge, Kans., reports that the high school class in physical geography visited the office on September 27, and received instruction in the use of the instruments and the work of the office.

Mr. F. P. Chaffee, Section Director, Montgomery, Ala., spoke, on the 10th instant, before the Montgomery County Agricultural Association, on the subject of the Weather Bureau and the value of its work. He paid particular attention to the methods of protecting crops from damage by frost, and touched on the harmful effects of "long-range" forecasting as at present attempted.

RAINFALL IN FIJI.

[From the Quarterly Journal of the Royal Meteorological Society. July, 1904. vol. 30, p. 252.]

Mr. R. L. Holmes, of Delanasau, Bua, Fiji, has sent us the following summary of his rainfall for 1903. The rain gage is 77 feet above sea level, and 1 mile from the sea.

1903.	Rainfall.	No. of rainy days.	Greatest daily fall.
	Inches.		*Inches.*
January ...	7.75	16	2.02
February ..	3.68	12	1.06
March	7.37	18	4.00
April	5.25	12	1.76
May	0.78	7	0.40
June.....	1.75	5	1.23
July	3.72	7	1.64
August	0.59	3	0.25
September .	0.45	6	0.17
October....	7.59	9	3.82
November .	6.45	6	2.74
December..	7.17	18	1.25
Year...	52.55	119	4.00

The rainfall for 1903 was the lowest registered during the previous thirty-two years, the next lowest being 56.87 inches in 1878. The average for the thirty-two years is 95.08 inches. The greatest yearly fall was 159.51 inches in 1871.

The rainfall for 1893 was also greatly in defect in other parts of Fiji, as will be seen from the following amounts for 1902 and 1903 in the island of Viti Levu:

Stations.	1902.	1903.
	Inches.	*Inches.*
Vuci Maca.....	113.22	61.49
Korociriciri....	106.95	75.94
Nausori	122.79	76.35
Naitasiri	126.78	106.78
Muanaweni....	155.49	122.01
Nadarivatu	128.43	66.38
Ba.....	85.70	57.10
Lautoka	65.98	42.62

PROFESSOR WARD ON THE CLIMATE OF THE UNITED STATES.

Prof. Robert DeC. Ward contributes a brief and interesting account of our climate to the June number of the Geographical Teacher.[1] While the American climatologist may find no new facts in these pages, he will be interested in the concise, lucid, and comprehensive treatment of so large a subject in so small a space.

Professor Ward divides the country into three climatic zones: First. The eastern climatic province, extending from the Atlantic Ocean to the one hundredth meridian, with warm summers and cold winters, differing but little in general climatic features from east to west, but with strong winter temperature gradients from north to south; influenced but slightly by the ocean on its eastern border and subjected to the sudden local weather changes attending the passage of cyclonic storms; favored by a sufficient and seasonable rainfall, varying from 60 inches near the Gulf and on the south Atlantic coast to 20 inches at about the one hundredth meridian, so that "the world hardly contains so large an area as this so well adapted to civilized occupation."

Second. The western plateau and mountain region, lying between the one hundredth meridian and the Sierra Nevada and Cascade ranges, having great differences of altitude and

[1] The climatology of the United States; an outline. The Geographical Teacher, London. Vol. 2, pp. 212–218.

characterized by the dryness, sunshine, light rainfall, extreme seasonal differences, and large diurnal temperature ranges of a mountain climate.

Third. The Pacific coast zone, with a mild and equable climate, due to the prevailing westerly winds from the neighboring ocean, and with marked latitudinal and seasonal variations in rainfall.

Professor Ward adds a brief but useful bibliography.—*F. O. S.*

THE THIRD CONVENTION OF WEATHER BUREAU OFFICIALS.

Peoria, Ill., was chosen for the meeting place of the Third Convention of Weather Bureau Officials, held on the 20th, 21st, and 22d of September of this year. Sixty-five officials of the Bureau, from every section of the country, were in attendance. The following papers were presented:

President's address.—Prof. Willis L. Moore.

Laboratory work in meteorology.—Prof. A. G. McAdie, San Francisco, Cal.

The Mount Weather Research Observatory.—Prof. F. H. Bigelow, Washington, D. C.

A symposium on the purposes of the Mount Weather Research Observatory.

Errors of instruments and the lines along which improvements should be sought.—Prof. C. F. Marvin, Washington, D. C.

Long-range weather forecasts.—Prof. E. B. Garriott, Washington, D. C.

Seasonal forecasts.—Prof. A. G. McAdie, San Francisco, Cal.

Amplification of forecasts for the benefit of perishable products.—Dr. W. M. Wilson, Milwaukee, Wis.

An aid in forecasting.—Mr. F. H. Brandenburg, Denver, Colo.

Report of board on revision of meteorological forms.

Forecasting fogs on the Gulf coast.—Mr. B. Bunnemeyer, Providence, R. I.

A popular account of the countercurrent theory of storms.—Prof. F. H. Bigelow, Washington, D. C.

Variations in insolation and in the polarization of blue sky light during 1903 and 1904.—Mr. H. H. Kimball, Washington, D. C.

A possible method for determining the direction and velocity of storm movement.—Mr. E. H. Bowie, St. Louis, Mo.

Temperature forecasts and iron ore shipments.—Mr. H. W. Richardson, Duluth, Minn.

Distribution of forecasts by telephone.—Dr. G. M. Chappel, Des Moines, Iowa.

Practicable rules for forecasting flood crest stages for Cairo, Ill.—Mr. P. H. Smyth, Cairo, Ill.

The Columbia River.—Mr. E. A. Beals, Portland, Oreg.

Diurnal periodicities in the climate of Baltimore.—Dr. C. L. Fassig, Baltimore, Md.

Instruction and research by Weather Bureau officials.—Prof. Cleveland Abbe, Washington, D. C.

A symposium on the teaching and position of meteorology in universities and other institutions.

Phenological observations at Wauseon, Ohio.—Mr. J. Warren Smith, Columbus, Ohio.

A study of rainfall on the west Florida coast.—Mr. B. Bunnemeyer, Providence, R. I.

Climatology of Porto Rico.—Mr. W. H. Alexander, Galveston, Tex.

Monthly statement of averages for rural press.—Mr. W. S. Belden, Vicksburg, Miss.

Irregularities in frost and temperature in neighboring localities.—Dr. I. M. Cline, New Orleans, La.

Former conventions of Weather Bureau officials.—Mr. James Berry, Washington, D. C.

A full report of the convention will be published as a bulletin of the Weather Bureau.

OBSERVATIONS FOR TWELVE MONTHS IN LASSA.

Climatic data from the forbidden city of Tibet has been obtained by M. Tysbikov, a Russian traveler, who resided in Lassa from August 15, 1900, until August 22, 1901. The following summary of his observations is taken from La Géographie, vol. 9, No. 1.

The year is divided into two seasons, the dry and the wet. (The influence of the monsoons of the Indian Ocean is felt even at this point.) In 1900 the dry season began toward the end of September; up to the end of April snow fell only twice. The rains began toward the middle of May, and 48 rainy days were counted up to the middle of September. The direction of the winds is in general from west to east. The mean temperature in the shade, observed three times a day during 235 consecutive days, is 5.2° C. at dawn, 14.5° at 1 p. m., and 9° at 9 p. m. The coldest month is December (mean for the three observations respectively —7.6°, +1.40°, —2.9°); the warmest month is June (14.6°, 22.8°, 17.2°). The large streams never freeze; the small ones are covered with only a thin layer of ice.

OBSERVATIONS AT THE FRANCO-SCANDINAVIAN STATION FOR AERIAL SOUNDINGS.

In a previous number of the REVIEW[1] Mr. Leon Teisserenc de Bort has described the station for systematic and continuous kite work, established by the cooperation of the French, Danish, and Swedish meteorological services at Hald, near Viborg in Jutland. In a recent communication to the Paris Academy of Sciences, Mr. Teisserenc de Bort gives some of the results of this work.[2]

Besides the meteorological observations, properly so called, a series of measurements of insolation have been made by Messrs. Holm and Jansson, our Swedish colleagues, with the Ångström pyrheliometer The maximum insolation, 1.314 small calories, was observed in July.

The barometric depressions, of slight extent, which pass over Jutland, are preceded by a change to the south in the lower wind, this movement taking place without any change in the upper currents. The rotation of the wind therefore begins in the lower levels and then rises into the region of the cumulus and the alto-cumulus. The temperatures obtained by the sounding balloons are not notably lower in the winter season than those that are obtained in the neighborhood of Paris; but we should note the very great decrease of temperature (0.9° per 100 meters) indicated on March 15, 1903, by a balloon that recorded a temperature of —38° at an altitude of 4400 meters, while a balloon sent up on the same day near Paris recorded only —17°. The day before, the temperature at the same height was about —16°, both at Hald and at Paris. The temperatures at the earth varied but 2° between these two days, while in the upper atmosphere they decreased more than 22°. This is a striking example of the now recognized fact that the variability of climate is greater at a certain height than near the ground.

Observations by kites have shown that in a great number of cases, even with rather low pressures, the winds from southwest to northwest diminish in velocity at a certain height. Sometimes this diminution has been gradual and in proportion to the increase in altitude; sometimes the wind remained quite strong or even increased in certain zones, especially in the neighborhood of cloud layers, and then fell suddenly to so low a velocity that the kites were arrested in their upward movement as if by an invisible ceiling.

It has been several times observed that such an increase in the wind as threatened to break the kite line has been followed by so marked a calm that the kites fell to the ground, with all the line, from a height of more than 1000 meters.

These facts, and others observed by us at Trappes and on the Mediterranean, show that we can not theorize on atmospheric phenomena as if they were continuous in time or space; such cases, on the contrary, are rare, and limited to certain atmospheric conditions.

WIND VELOCITY AND OCEAN WAVES.

In connection with a study of ocean waves[3] Dr. Vaughn Cornish has prepared a table showing the relation between their height and the velocity of the wind. Taking tables previously published by Desbois, Antoine, and Paris, in which

[1] Monthly Weather Review, April, 1903, vol. 31, p. 177.

[2] Comptes Rendus, June 27, 1904, vol. 138, p. 1736.

[3] On the dimensions of deep-sea waves and their relation to meteorological and geographical conditions. The Geographical Journal, London, May, 1904, vol. 23, p. 623–645.